UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

August 13, 2002

Ms. Shannon C. Stewart
Environmental Specialist
Department of Energy
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Re: Endangered Species Act and Essential Fish Habitat Consultations: Biological Assessment for the L3 Diversion Modifications, Lemhi River, Idaho (One Project)

Dear Ms. Stewart:

Enclosed is the biological opinion prepared by the National Marine Fisheries Service (NOAA Fisheries) on the L3 Diversion Modification. The enclosed document represents NOAA Fisheries' biological opinion on the effects of the proposed action on listed species and designated critical habitat in accordance with Section 7 of the Endangered Species Act of 1973 as amended (16 USC 1531 *et seq*.).

In this biological opinion, NOAA Fisheries has determined the proposed action is not likely to jeopardize the continued existence of Snake River spring/summer chinook salmon, Snake River steelhead, or Snake River sockeye salmon. NOAA Fisheries has also determined that the proposed action is not likely to result in the destruction or adverse modification of critical habitat for Snake River chinook salmon or Snake River sockeye salmon. A complete administrative record of this consultation is on file with NOAA Fisheries' Habitat Conservation Division in Boise, Idaho.

In addition to the biological opinion, enclosed as section III, is a consultation regarding Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). NOAA Fisheries finds that the proposed action may adversely affect EFH for Snake River chinook salmon. NOAA Fisheries anticipates the terms and conditions from the ESA consultation will reduce adverse effects on EFH.

Ms. Janna Brimmer (208) 756-6496, and Ms. Jan Pisano (208) 756-6478 are the NOAA Fisheries contacts for this consultation.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

cc: D. Mignogno, USFWS
T. Curet, IDFG
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C. Colter, Shoshone-Bannock Tribes
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Endangered Species Act
Section 7 Consultation
Biological Opinion
and
Magnuson-Stevens Act
Essential Fish Habitat Consultation

L3 Irrigation Diversion Modification
Lemhi River
Lemhi County, Idaho

Agency: Bonneville Power Administration

Consultation Conducted By: National Marine Fisheries Service, (NOAA Fisheries)
Northwest Region

Date Issued: August 13, 2002

Issued by: Michael R Crouse
F.r
D. Robert Lohn
Regional Administrator

Refer to: F/NWR/2002/00670

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I. INTRODUCTION

The Bonneville Power Administration (BPA) proposes to replace the existing push-up dam at L3 on the Lemhi River with a permanent structure. The purpose of the proposed diversion is to improve fish passage and to eliminate the need for annual in-stream maintenance of the diversion structure. The BPA is proposing the action according to its authority under the Pacific Northwest Electric Power Planning and Conservation Act of 1980. The Bureau of Reclamation (BOR) has been tasked with administering this project. The original project, as proposed, also included replacement of the diversion at L3A. This Biological Opinion (Opinion) only addresses L3; L3A is addressed in a separate biological opinion (August 2, 2002).

A. Background and Consultation History

Irrigation withdrawals for agricultural and other uses in the Lemhi River subbasin have interrupted tributary connectivity to the mainstem Lemhi River system. During low to average water years, the combination of low flows and physical barriers from gravel/rock berm diversion dams inhibit both upstream and downstream migration of adult and juvenile salmon and steelhead (IDFG 2001). This has significantly contributed to the decline of anadromous salmonids.

The current project was proposed under BPA's Power Emergency Action Plan and was approved for funding in July 2001. This project proposes to replace the existing L3 rock berm with a new permanent diversion. The L3 structure has been designed and will be constructed to facilitate upstream and downstream passage of resident and anadromous fish during migration times and reduce the amount of instream work needed to maintain the diversion.

In December 2000, National Marine Fisheries Service (NOAA Fisheries) issued the Biological Opinion on the "Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin (FCRPS Opinion) (NMFS 2000). The FCRPS Opinion included 199 Reasonable and Prudent Alternatives (RPA) actions. One of these RPAs, Action 149, states that the Bureau of Reclamation

> "shall initiate programs in three priority subbasins (identified in the Basinwide Recovery Strategy) per year over 5 years, in coordination with NMFS, FWS (U.S. Fish and Wildlife Service), the states, and others, to address all flow, passage, and screening problems in each subbasin over 10 years . . . This action initiates immediate work in three such subbasins per year, beginning in the first year with the Lemhi, Upper John Day, and Methow subbasins."

The BOR responded by drafting "Evaluations of Six Priority Subbasins for the Implementation of 1-Year Plans in Fiscal Year 2002" (BOR 2001), in which the Lemhi was addressed. The diversion at L3 was identified as needing modification or replacement. The Hydropower Program and Habitat Conservation Division of NOAA Fisheries have been active participants in the development of plans for the replacement of these diversions. A detailed list of important

events during the planning stages and initial consultation of this project can be found in Appendix A.

The objective of this Opinion is to determine whether the L3 Diversion Modification Project is likely to jeopardize the continued existence of the Snake River spring/summer chinook salmon, Snake River sockeye salmon, and Snake River steelhead, result in the destruction or adverse modification of critical habitat for Snake River chinook salmon or Snake River sockeye salmon, or adversely affect Essential Fish Habitat (EFH) for chinook salmon. The BPA initiated Endangered Species Act (ESA) and EFH consultations on the L3 and L3A Diversion Modifications in a letter dated April 3, 2002, received by NOAA Fisheries on April 8, 2002. The BPA also provided a biological assessment (BA) for the proposed action dated April 2002.

B. Proposed Action

Proposed actions are defined by NOAA Fisheries regulations (50 CFR 402.02) as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas." Because the BPA will fund the action, a Federal nexus exists for interagency consultation under ESA section 7(a)(2). The proposed action is in the mainstem Lemhi River at approximately River Mile Three. This stream reach is occupied by Snake River spring/summer chinook salmon and Snake River steelhead and is designated critical habitat for Snake River spring/summer chinook salmon. Snake River sockeye salmon do not occur in the Lemhi River.

The purpose of the proposed action is to improve passage for all life stages of resident and anadromous fish species. To accomplish this, the project will remove the existing L3 push-up dam and install one rock weir. A 6-foot wide metal fish passage slot will be installed near the left bank with the crest of the slot 12 inches below the crest of the dam. Rock on the upstream side of the weir will be removed to achieve a 2:1 slope and a flexible geotextile membrane will be installed on the face of the weir. The membrane will extend 10 to 20 feet upstream of the weir to reduce seepage under the structure and bring water to the surface and through the fish slot. Two-foot thick rock material will be placed over the membrane to hold it in place and add integrity to the structure.

Conservation measures that were identified by BPA include:

> a. In-channel work will take place from August 1 to October 1. Fish passage provisions will be in place at all times. Work can continue from October 1 to December 15 if a coffer dam or other structure is in place prior to October 1 to divert water around the construction site and into an unobstructed channel. From December 15 to March 1, work may take place without the coffer dam or diversion structure, if structures allowing fish passage are in place.

b. Best Management Practices (BMPs) appropriate to the type of work being performed will be in place at all times when work is being performed. These may include, but are not limited to, straw bales and silt fences.

c. Staging areas for vehicles and equipment will be at least 100 feet away from any waterway or wetland area. Where possible, a minimum buffer of 150 feet will be used.

d. Heavy equipment left on-site will use drip pans as necessary to minimize soil contamination from leaks.

e. Emergency spill containment equipment will be available at all times to manage petroleum product spills or leaks. If a spill or leak should occur, it will be managed and cleaned up immediately and the appropriate officials notified.

f. No chemical dust suppressants will be used within 25 feet of any waterway. The use of water for dust suppression is preferred. Water will only be drawn from a site approved by NOAA Fisheries and/or FWS fisheries biologists. Water drawn from any location other than immediately below the fish screen will use 3/32 inch screens on the intake hose (see Appendix B).

g. All fuel and petroleum products will be stored at least 100 feet from existing waterways and wetlands, if they are stored on site. Where possible, a minimum buffer of 150 feet will be used.

h. Equipment used in the river will be inspected each day and whenever fueling takes place to ensure there are no leaks from hydraulic lines or other locations on the equipment. Equipment with leaks detected either during this inspection or during operations will not be used in or near the stream, until the leak is stopped and the area cleaned.

i. Areas disturbed by construction will be replanted and/or reseeded by the beginning of the next growing season, or at the end of the project if there is sufficient growing time before onset of cold weather. Site reclamation will include replanting with native vegetation similar to what was removed during construction. Recommendations for types of plant species, timing of planting, and additional technical information are referenced in Natural Resource Conservation Service Technical Bulletins. Species that will not be used include Kentucky bluegrass and several species of crested wheatgrass.

j. All construction and design criteria developed for the project will be implemented as stated in the L3 and L3A Diversion and Modifications contract documents and specifications.

k. In the event there are changes in the project plan, NOAA Fisheries and FWS will be notified and consultation will take place on any potential impacts to ESA listed species and their habitat.

II. ENDANGERED SPECIES ACT

The ESA of 1973 (16 USC 1531-1544), as amended, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with FWS and NOAA Fisheries, as appropriate, to ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their designated critical habitats. This Opinion is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA and implementing regulations found at 50 CFR 402.

A. Biological Opinion

The objective of this Opinion is to determine whether the L3 Diversion Modification is likely to jeopardize the continued existence of the Snake River spring/summer chinook salmon, Snake River sockeye salmon, or Snake River steelhead, or result in the destruction or adverse modification of designated critical habitat for Snake River spring/summer chinook salmon or Snake River sockeye salmon.

1. Biological Information and Critical Habitat

The proposed action may affect the ESA-listed species and designated critical habitat identified below in Table 1. Based on life history timing for these evolutionary significant units (ESUs), it is likely that incubating eggs, juveniles, smolts, and adult life stages of these listed species would be affected by the proposed action.

Critical habitat as designated for Snake River spring/summer chinook salmon and Snake River sockeye salmon includes all waterways, substrates, and adjacent riparian areas that provide the following functions: shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter, below longstanding, natural impassable barriers (i.e., natural waterfalls in existence for at least several hundred years) and dams that block access to former habitat. The proposed action would occur in designated critical habitat for Snake River spring/summer chinook salmon and may affect essential features of critical habitat.

Essential features of critical habitat for the listed species are: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (juvenile only), (8) riparian vegetation, (9) space, and (10) safe passage conditions. The project activities

are likely to affect the following essential features: substrate, water quality, water quantity, water velocity, and safe passage conditions.

Table 1. References for Additional Background on Listing Status, Biological Information, Protective Regulations, and Critical Habitat Elements for the ESA-Listed and Candidate Species Considered in this Consultation.

Species ESU	Status	Critical Habitat	Protective Regulations
Chinook Salmon (*Oncorhynchus tshawytscha*)	April 22, 1992; 57 FR 14653, Threatened	October 25, 1999; 64 FR 57399[1]	July 10, 2000; 65 FR 42422
Snake River Spring/Summer Sockeye Salmon (*O. nerka*)	November 20, 1991; 56 FR 58619, Endangered	December 28, 1993; 58 FR 68543	ESA section 9 applies
Snake River Steelhead (*O. mykiss*)	August 18, 1997; 62 FR 43937, Threatened	February 16, 2000; 65 FR 7764; remanded April 30, 2002	July 10, 2000; 65 FR 42422

[1] This corrects the original designation of December 28, 1993, (58 FR 68543) by excluding areas above Napias Creek Falls, a naturally impassable barrier.

Snake River Spring/Summer Chinook

The Snake River spring/summer chinook salmon ESU includes all natural-origin populations in the Tucannon, Grande Ronde, Imnaha, and Salmon Rivers. Some or all of the fish returning to the Tucannon River, Imnaha, Grande Ronde, Sawtooth, Pahsimeroi, and McCall hatcheries are also listed.

Historically, the Snake River drainage is thought to have produced more than 1.5 million adult spring/summer chinook salmon in some years during the late 1800s (Matthews and Waples 1991). By the 1950s, the abundance of spring/summer chinook had declined to an annual average of 125,000 adults. Adult returns counted at Lower Granite Dam reached all-time lows in the mid-1990s (<8,000 adult returns), and numbers have increased somewhat since 1997. Habitat problems are common in the range of this ESU. Spawning and rearing habitats are often impaired by factors such as tilling, water withdrawals, timber harvest, grazing, mining, and alteration of floodplains and riparian vegetation. Mainstem Columbia River and Snake River hydroelectric developments have altered flow regimes and estuarine habitat and disrupted migration corridors. Competition between natural indigenous stocks of spring/summer chinook

salmon and spring/summer chinook of hatchery origin has likely increased due to an increasing proportion of naturally-reproducing fish of hatchery origin.

Compared to the greatly reduced numbers of returning adults for the last several decades, exceptionally large numbers of adult chinook salmon returned to the Snake River drainage in 2000 and in 2001. These large returns are thought to be a result of favorable ocean conditions, and above average flows in the Columbia River Basin when the smolts migrated downstream. However, these large returns are only a fraction of the returns of the late 1800s. Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline. In the Lemhi subbasin, chinook salmon are currently only found in the mainstem Lemhi River and in Hayden Creek. Redd count data from 1952 to 1997 in the Lemhi River is included in Appendix C. Detailed information on the current range-wide status of Snake River chinook salmon under the environmental baseline, is described in the Status Review of Chinook Salmon From Washington, Idaho, Oregon, and California (Myers et el. 1998).

Snake River Steelhead

The Snake River steelhead ESU includes all natural-origin populations of steelhead in the Snake River basin. None of the hatchery stocks in the Snake River basin are listed, but several are included in the ESU. Designated critical habitat for Snake River steelhead was administratively withdrawn on April 30, 2002, and there is currently no designated critical habitat for Snake River steelhead.

In listing the Snake River steelhead as threatened, NOAA Fisheries determined that the ESU is not presently in danger of extinction, but is likely to become endangered in the foreseeable future. This is due largely to the declining abundance of natural runs over the past decades. Some of the significant factors in the declining populations are mortality associated with the many dams along the Columbia and Snake Rivers, losses from harvest, loss of access to more than 50% of their historic range, and degradation of habitats used for spawning and rearing. Possible genetic introgression from hatchery stocks is another threat to Snake River steelhead since wild fish comprise such a small proportion of the population. Additional information on the biology, status, and habitat elements for Snake River steelhead are described in Busby et al. (1996).

The 2000 and 2001 counts at Lower Granite Dam indicate a short-term increase in returning adult spawners. Adult returns (hatchery and wild) in 2001 were the highest in 25 years and 2000 counts were the sixth highest on record (Fish Passage Center 2001b). Increased levels of adult returns are likely a result of favorable ocean and instream flow conditions for these cohorts. Although steelhead numbers have dramatically increased, wild steelhead comprise only 10% to 20% of the total returns since 1994. Consequently, the large increase in fish numbers does not necessarily reflect a change in steelhead status based on historic levels. Recent increases in the population are not expected to continue, and the long-term trend for this species indicates a decline.

Survival of downstream migrants in 2001 was the lowest since 1993. Low survival was due to record low run-off volume, and elimination of spills from the Snake River dams to meet hydropower demands (Fish Passage Center, 2001a). Average downstream travel times for steelhead nearly doubled and were among the highest observed since recording began in 1996. Consequently, wide fluctuations in population numbers are expected over the next few years when adults return to spawning areas. Currently in the Lemhi subbasin, steelhead are only found in the mainstem Lemhi River and in Hayden Creek. Detailed information on the current range-wide status of Snake River steelhead, under the environmental baseline, is described in the Status Review of West Coast Steelhead From Washington, Idaho, Oregon, and California (Busby et el. 1996), and Status Review Update for West Coast Chinook Salmon (*Oncorhynchus Tshawytscha*) From Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River (UCR) Spring Run ESUs (BRT 1998)

Snake River Sockeye Salmon

The Snake River sockeye salmon ESU includes populations of sockeye salmon from the Snake River basin, Idaho (extant populations occur only in the Salmon River subbasin). Under NOAA Fisheries' interim policy on artificial propagation (58 FR 17573), the progeny of fish from a listed population that are propagated artificially are considered part of the listed species and are protected under ESA. Thus, although not specifically designated in the 1991 listing, Snake River sockeye salmon produced in the captive broodstock program are included in the listed ESU. Given the dire status of the wild population under any criteria (16 wild and 264 hatchery-produced adult sockeye returned to the Stanley basin between 1990 and 2000), NOAA Fisheries considers the captive broodstock and its progeny essential for recovery.

Snake River sockeye salmon enter the Columbia River in late spring and early summer and reach the spawning lakes in late summer and early fall. The entire mainstem Salmon River has been designated as critical habitat for sockeye salmon (50 CFR Part 226, December 28, 1993), but all spawning and rearing habitat is in the Upper Salmon subbasin. The only potential effect this action will have on sockeye salmon is the possible short-term increase in sediment and turbidity in the Salmon River below the mouth of the Lemhi. This impact will probably not occur and if it does, it will be negligible and of short duration; therefore, no adverse effect on sockeye salmon is expected. Sockeye salmon will not be addressed again in this Opinion.

2. Evaluating the Proposed Action

The standards for determining jeopardy and adverse modification of critical habitat are set forth in section 7(a)(2) of the ESA as defined by 50 CFR 402.02 (the consultation regulations). In conducting analyses of habitat-altering actions under section 7 of the ESA, NOAA Fisheries uses the following steps of the consultation regulations combined with the Habitat Approach (NMFS 1996): (1) Consider the status and biological requirements of the species; (2) evaluate the relevance of the environmental baseline in the action area to the species' current status; (3) determine the effects of the proposed or continuing action on the species; (4) consider cumulative effects; and (5) determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild or adversely modify its critical habitat. In completing this final step of the analysis, NOAA Fisheries determines whether the action under consultation, together with all cumulative effects when added to the environmental baseline, is likely to jeopardize the ESA-listed species or result in the destruction or adverse modification of critical habitat. If either or both are found, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

Recovery planning will help identify feasible measures that are important in each stage of the salmonid life cycle for conservation and survival within a reasonable time. In the absence of a final recovery plan, NOAA Fisheries must ascribe the appropriate significance to actions to the extent available information allows. NOAA Fisheries intends that recovery planning identifies areas/populations that are most critical to species conservation and recovery from which proposed actions can be evaluated for consistency under section 7(a)(2).

a. Biological Requirements in the Action Area

The first step NOAA Fisheries uses when applying the ESA section 7(a)(2) to the listed ESUs considered in this Opinion is to define the species' biological requirements within the action area. NOAA Fisheries also considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species within the action area, NOAA Fisheries starts with the determinations made in its decision to list for ESA protection the ESUs considered in this Opinion and also considers any new data that is relevant to the determination.

Relevant biological requirements are those necessary for the listed ESU's to survive and recover to naturally reproducing population sizes at which protection under the ESA would become unnecessary. This will occur when populations are large enough to safeguard the genetic diversity of the listed ESUs, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment. Interim recovery objectives developed by the Interior Columbia Technical Recovery Team are identified in Table 2 (NMFS 2002). For this consultation, the relevant biological requirements are substrate,

water quality, water quantity, water velocity, and safe passage conditions that function to support successful adult and juvenile migration, adult holding, spawning, incubation, rearing, and growth and development to adulthood.

Table 2. Interim abundance targets of spawners returning to the Lemhi River (NMFS 2002).

ESU	Target Number of Spawners
Snake River Spring/Summer Chinook Salmon	2200
Snake River Steelhead	1600

b. Environmental Baseline

The environmental baseline includes "the past and present impacts of all Federal, State, or private actions and other human activities in the action area, including the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation and the impacts of State and private actions that are contemporaneous with the consultation in progress" (50 CFR 402.02). Step two of NOAA Fisheries' evaluation of jeopardy/adverse modification of critical habitat evaluates the relevance of the environmental baseline in the action area as it relates to the species' current status.

In describing the environmental baseline, NOAA Fisheries emphasizes essential elements of designated critical habitat or habitat indicators for the listed salmonid ESUs affected by the proposed action. The action area is described in section I.A.1. of this document.

The Lemhi River watershed drains approximately 1,260 square miles between the Beaverhead Range on the north and east sides, and the Lemhi Range on the west. Elevations range from 4,100 feet above mean sea level (amsl) at the confluence with the Salmon River one mile north of the town of Salmon, to over 11,000 feet amsl. Average annual precipitation ranges from 7 inches at lower elevations to 23 inches in the mountains. Most of the land immediately adjacent to the Lemhi River and it's major tributaries is in private ownership, the Bureau of Land Management (BLM) manages the land at the mid elevations, and the US Forest Service (USFS) manages the high elevation forests. State-owned lands are scattered throughout the basin (USDI-BLM 1999).

Riparian vegetation consists primarily of willow, water birch, alder, red-osier dogwood, Wood's rose, chokecherry, gooseberry, current, aspen, and cottonwood, along with numerous sedges and rushes. Degraded areas are dominated by Kentucky bluegrass, clovers, and dandelion. Upland vegetation is primarily basin big sagebrush and bluebunch wheatgrass although elevation, slope, aspect, and soil type affect species composition. Other species present in the sagebrush steppe include Idaho fescue, mountain big sage, Wyoming sagebrush, three-tip sage, low sage, shadscale, and greasewood. High elevations consist of Douglas fir and lodgepole pine forests, with some Engelmann spruce and subalpine fir (USDI-BLM 1999).

Many areas in the Lemhi River watershed are impaired by invasions of exotic weed species that have displaced native plants. Common invasion species include spotted knapweed, leafy spurge, and white top. Exotic weed invasions occur most frequently where the soil has been disturbed, especially along road right-of-ways and areas that have been intensively grazed. Unnatural, disclimax plant communities exist in many disturbed riparian areas, through the combined effects of riparian grazing and displacement of native plants by exotic forbs. The persistence of disclimax communities in riparian areas prevents establishment of grasses and shrubs that provide important riparian functions such as streambank stability, cover from overhanging vegetation, shade, and sources of terrestrial invertebrate prey.

The Lemhi River is a low gradient spring-fed system. The hydrology has been changed dramatically in the last 150 years, beginning with beaver and beaver dam removal, and continuing today with extensive irrigation withdrawals and channel alterations. All tributaries except Hayden Creek and Big Springs Creek are seasonally dewatered and no longer reach the mainstem Lemhi during the irrigation season (April to October) (USDI-BLM 1999). The lower portion of the Lemhi River, where the proposed action will occur, is classified primarily as a migration corridor, although returning hatchery steelhead have constructed redds in the immediate vicinity of the proposed action area. It is not known whether any of these redds have been successful.

Beginning in the late 1850's, chinook salmon were trapped along the Lemhi River and sold commercially. Anadromous fish runs were nearly lost at the turn of the century when a hydroelectric facility was constructed near the mouth of the Lemhi. The plant was operated until 1950. The dam was removed in 1958 and the plant is still there. The rebound in the run between 1950 to 1960 is probably due to the plant shutdown, since when the plant was closed the stop logs were removed to allow fish passage. With the decommissioning of the hydroelectric plant in the 1950's, salmon and steelhead returned, but to levels below the capacity of the system. This decline may be partially due to a Bureau of Commercial Fisheries egg-taking program which was stationed in Salmon during the 1930's. The program took eggs from Lemhi River fish and shipped them throughout the northwest, to the dismay of local residents who blamed the program for much of the subsequent decline. The station closed in 1940 due to an inadequate number of returning spawners. Spring chinook redd counts in the Lemhi River have steadily declined from an annual average of 961 between 1957 and 1967, to less than 100 redds from 1989 to 1993. The decline continued through the mid-90's, reaching a low of five redds in 1995 and has increased to 316 redds in 2001 (IDFG unpub. data).

Currently, fish passage through the lower portion of the river is impaired by low water conditions and structures associated with irrigation diversions. In 2001 the Idaho Office of Species Conservation, Idaho Department of Water Resources, Idaho Department of Fish and Game, NOAA Fisheries, FWS, The Lemhi Irrigation District, Water District 74, and the Upper Salmon Basin Watershed Project entered into an agreement (Lemhi Agreement) that among other things, provides stream flows sufficient for fish passage between the L6 diversion and the mouth of the Lemhi River. This is done through a combination of landowner agreements and

annual water leases that are still being refined. The Lemhi Agreement also sets a time frame for development of a Habitat Conservation Plan for irrigation in the Lemhi River subbasin that addresses instream flow and other components of resident and anadromous fish habitat.

In addition to the Lemhi Agreement, the BOR is pursuing several diversion improvements to comply with the 2000 FCRPS Opinion (NMFS 2000). Together, these activities should improve passage in the lower river, which has adversely impacted upstream and downstream migrants. In addition, the Upper Salmon River Watershed Project is actively working with landowners to improve riparian habitat on private land. A comprehensive listing of past and current restoration efforts in the Lemhi can be found in the 2002 Lemhi Agreement (IOSC et el. 2002).

3. Analysis of Effects of Proposed Action

Effects of the action are defined as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with the action, that will be added to the environmental baseline" (50 CFR 402.02). Direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing essential elements of critical habitat. Indirect effects are defined in 50 CFR 402.02 as “those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.” They include the effects on listed species or critical habitat of future activities that are induced by the proposed action and that occur after the action is completed. “Interrelated actions are those that are part of a larger action and depend on the larger action for their justification” (50 CFR 403.02). “Interdependent actions are those that have no independent utility apart from the action under consideration” (50 CFR 402.02).

a. Effects of Proposed Action

Step three of NOAA Fisheries jeopardy/adverse modification approach evaluates the effects of proposed actions on listed salmon and steelhead in the context of the status of the species and their habitats. To avoid jeopardy and destruction/adverse modification of critical habitat for listed salmon and steelhead, proposed actions generally must cause no more than minimal amounts of incidental take of the species, and also must restore, maintain, or at least not appreciably interfere with the recovery of the properly functioning condition (PFC) of the various fish habitat elements within a watershed.

The BA provides a detailed analysis of the effects of the proposed action on Snake River spring/summer chinook salmon and Snake River steelhead trout, and the critical habitat of Snake River chinook salmon. In reviewing the BA and accompanying narratives, NOAA Fisheries focuses on the elements of the proposed action that have the potential to affect the fish or essential elements of their habitat or critical habitat.

Direct effects of the implementation of this project will include instream work to remove the existing rock dam and install the rock weir and geotextile membrane. This could result in a

short-term increase in sediment and turbidity and disruption of migration timing. However, construction activities will occur between August 1, 2002, and March 1, 2002, and fish passage will not be blocked during construction. This will minimize impacts on anadromous fish species. Also, construction during low water conditions and the use of BMPs will minimize the amount of sediment introduced to the water column. As an indirect effect, existing refugia and resting cover will be disturbed, but will reestablish as the channel adjusts to the changes. Instream habitat will be improved by the construction of these weirs because of the scour pools that will be installed immediately below each weir. Also, new resting areas will be established along the legs of each weir.

Salmon and steelhead habitat are affected by exotic weeds when the invasions result in the establishment of disclimax communities. Disclimax communities occur naturally when frequent disturbances prevent establishment of species associated with late seral stages. Natural examples of disclimax communities include avalanche chutes and certain grasslands. Proposed activities that expose bare soils may create conditions where disclimax communities become established, due to the large numbers of exotic plants in the Lemhi River watershed. If exotic weeds create disclimax riparian communities, riparian functions provided by grasses and shrubs would be lost or impaired.

Existing irrigation methods require that the irrigator perform annual (or more frequent) instream maintenance of the push-up berm using heavy machinery. This results in disturbance and compaction of the substrate, increased introduction of sediment into the water column, and the potential introduction of petroleum products into the river via leaking equipment. In addition, the push-up dam may interfere with fish passage at lower flows. Replacing the push-up berm with a permanent structure will improve conditions for upstream and downstream migrating fish by eliminating annual instream maintenance, improving water quality conditions, creating step pools, increasing flow over the new structures, reducing the amount of water diverted out of the river, and creating a defined channel.

b. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Other activities within the watershed have the potential to impact fish and habitat within the action area. Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being reviewed through separate section 7 consultation processes. Past Federal actions have already been added to the environmental baseline in the action area.

Plans for replacement of the diversion structure at L3A are also being reviewed. Consultation was separated to allow consultation to proceed on L3A while negotiations continued on L3. When completed, the structure at L3A will be similar to L3 in that rocks, an impermeable membrane, and a metal plate with a notch for fish passage will be used. Three "v"-shaped weirs will be constructed, which will concentrate water through the fish notchs during low flow conditions, facilitating passage. Step pools will be created, and more water will be left in the river channel. Finally, the need for annual maintenance of the existing push-up dam will be eliminated.

4. Conclusion

The final step in NOAA Fisheries' approach to determine jeopardy or adverse modification is to determine whether the proposed action, in light of the above factors, is likely to appreciably reduce the likelihood of species survival in the wild or adversely modify critical habitat. NOAA Fisheries has determined that when the effects of the proposed action are added to the environmental baseline and cumulative effects occurring in the action area, the action is not likely to jeopardize the continued existence of the two listed ESUs considered in this Opinion. Further, NOAA Fisheries concludes that the subject action would not cause adverse modification or destruction of designated critical habitat for Snake River spring/summer chinook salmon.

These conclusions were based on the following considerations: (1) The proposed action is not likely to impair properly functioning habitat, appreciably reduce the functioning of already impaired habitat, or retard the long-term progress of impaired habitat toward PFC; (2) the proposed action will eliminate the degrading effects of current operations; and (3) the proposed action will improve fish passage through this portion of the river. In reaching these determinations, NOAA Fisheries used the best scientific data available.

5. Conservation Recommendations

Conservation recommendations are defined as suggestions of NOAA Fisheries "regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information" (50 CFR 402.02). Section 7 (a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. NOAA Fisheries believes the conservation recommendations listed below are consistent with these obligations, and therefore should be implemented by the BPA.

1. The BPA should make every effort to minimize the duration of construction activities.

2. The BPA should attempt to minimize the spatial extent of disturbance.

6. Reinitiation of Consultation

This concludes formal consultation under the ESA on the L3 Diversion Modification as outlined in the BA submitted in April 3, 2002. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

B. Incidental Take Statement

Sections 4 (d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined in 50 C.F.R. 222.102 as "an act that may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering." Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

1. Amount or Extent of Take

The proposed action is reasonably certain to result in incidental take of the listed species. NOAA Fisheries is reasonably certain the incidental take described here will occur because: (1) recent and historical surveys indicate the listed species are known to occur in the action area; and/or
(2) the proposed action would adversely affect essential features of critical habitat that would in turn reduce the survival of the listed species for feeding, breeding, or sheltering. Despite the use

of best scientific and commercial data available, NOAA Fisheries cannot quantify a specific amount of incidental take for individual fish or incubating eggs for this action. Instead, the extent of take is anticipated to be restricted to less than 100 meters immediately downstream of the project area and occur only during the period of construction.

2. Reasonable and Prudent Measures

Reasonable and Prudent Measures (RPMs) are non-discretionary measures to minimize take, that are not already part of the description of the proposed action. They must be implemented as binding conditions for the exemption in section 7(a)(2) to apply. The BPA has the continuing duty to regulate the activities covered in this incidental take statement. If BPA fails to require the applicants to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(a)(2) may lapse. NOAA Fisheries believes that activities carried out in a manner consistent with these reasonable and prudent measures, except those otherwise identified, will not necessitate further site-specific consultation. Activities which do not comply with all relevant reasonable and prudent measures will require further consultation.

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize take of listed fish resulting from implementation of the action. These reasonable and prudent measures would also minimize adverse effects on designated critical habitat.

1. The BPA shall minimize the amount and extent of incidental take from construction activities by implementing BMP's.

2. The BPA shall minimize the amount and extent of incidental take by ensuring the project is accomplishing its goal of improving passage for all life stages of anadromous and resident fish species.

3. Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, BPA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for each category of activity. These terms and conditions are non-discretionary.

1. To implement Reasonable and Prudent Measure #1, above, BPA shall implement all conservation measures identified in the Biological Assessment and Contract documents. These are identified in Section I.B. of this Opinion. In addition,

a. "Waterway" is defined as any perennial, intermittent, or manmade channel.

b. If reseeding or replanting cannot occur immediately following completion of construction, soil conservation measures such as matting or straw bales shall be placed to minimize soil erosion until spring.

c. The BPA shall inform NOAA Fisheries of the planned construction schedule to allow NOAA Fisheries to observe any construction activities. Contact: NOAA Fisheries, ATTN: Jan Pisano, 100 Courthouse Drive, Salmon, Idaho, 83467; or call (208)756-6478.

2. To implement Reasonable and Prudent Measure #2, above, BPA shall perform monitoring and evaluation in accordance with conditions outlined in the L3 and L3A Diversion and Modifications contract document. In addition,

c. The structure shall be visually inspected at least annually to ensure structural integrity and unobstructed fish passage through the notch. If at any time a determination is made that the structure is not performing as intended, NOAA Fisheries and FWS will be included in discussions regarding repair. Items that will be monitored are:

i. The notch will be inspected to ensure that they have not been blocked by debris such as rocks or logs.

ii. The notch will be inspected to ensure it is functioning as designed over the entire range of river flow, with particular attention to water depth and velocity through the notch.

d. During the first year following installation, the structure will be monitored daily during migration periods to ensure that the diversion is not acting as a barrier. The presence of stalled or struggling anadromous or resident fish (either juvenile or adult) attempting to move either upstream or downstream is an indication that the structure is not functioning as designed, and NOAA Fisheries and FWS will be notified. Struggling resident fish are an indication that anadromous fish may have difficulty navigating the structures. Reinitiation of consultation may be necessary.

e. During the first year following installation, flows immediately below the L3 structure should be checked at various rates of discharge to ensure that minimum flow requirements for anadromous fish passage are being met. This Term and Condition will supplement the Lemhi Agreement (IOSC et el. 2002) and the monitoring plan developed to support it. The additional flow data will also provide valuable information to be used in the

development of the Long Term Conservation Agreement being developed in compliance with the Lemhi Agreement. In addition to flows, depth transects should be taken at various rates of discharge, and temperature monitored. Idaho Department of Fish and Game is currently monitoring temperature immediately above and below the L3 site as part of the Lemhi Agreement.

f. Impacts to habitat from the installation of the new diversion will be monitored. Minimum data collected will be channel width and depth immediately downstream from the weirs. Measurements will be made immediately following construction, and at least annually thereafter. During the first year after construction, width and depth measurements will be made several times at various rates of discharge (see above Term and Condition).

g. Vegetation will be monitored during the first fall following replanting/reseeding, the following spring, and then annually for five years. Any dead plantings of woody vegetation will be replanted to achieve a minimum 80% survival after three years, and grasses will be reseeded if not reestablished. Access by cattle to the site will be restricted for at least three years following construction to allow vegetation to reestablish.

h. Revegetated areas will be monitored to evaluate reestablishment of desired riparian plant species. The monitoring activities will include and estimate of the survival rates of desired woody species and a general assessment of the success of grass seeding. Vegetation will be monitored during the first fall following planing/seeding, the following spring, and then annually for 5 years.

i. Revegetated sites will be maintained to ensure successful reestablishment of desired riparian plant species, and to avoid displacement of desired plants by exotic species. Any unsuccessful planting of woody vegetation will be replanted to achieve a minimum of 80% survival after 3 years, and grasses will be reseeded if not reestablished. Access by cattle to this site will be restricted for at least 3 years following construction to allow vegetation to reestablish. Exotic weeds will be hand pulled when ever possible.

j. A report documenting the results of this monitoring (Terms and Conditions Items 2a-h) will be prepared annually and submitted to NOAA Fisheries ,100 Courthouse Drive, Suite F., Salmon, Idaho 83467.

3. If a dead, injured, or sick listed species specimen is found, initial notification must be made to the National Marine Fisheries Service Law Enforcement Office, in the Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; or call: (360) 418-4246. Care should be taken in handling sick or injured specimens to ensure effective treatment and care. Dead specimens should be handled to preserve biological material in the best possible state for later analysis of cause of death. With the care of sick or injured listed species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed.

III. Magnuson-Stevens Fishery Conservation and Management Act

A. Background

Public law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Management and Conservation Act (MSA) to establish new requirements for EFH. The regulations require designation of EFH in Federal fishery management plans. The EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (MSA §3). The Pacific Fisheries Management Council has designated EFH for Federally managed Pacific groundfish and coastal pelagic and Pacific salmon fisheries. The EFH for the groundfish and coastal pelagic fisheries are marine designations, while the Pacific salmon EFH includes freshwater, marine, and estuarine environments.

The EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting, or funding activities that may adversely affect EFH, regardless of its location. The consultation requirements of section 305(b) of the MSA [16 U.S.C. 1855(b)] provide that:

1. Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.

2. NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH.

Federal agencies shall, within 30 days after receiving conservation recommendations from NOAA Fisheries, provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

B. Pacific Coast Salmon and Essential Fish Habitat Affected by the Proposed Action

The Pacific Coast Salmon Fishery Management Plan (FMP) was approved by the Secretary of Commerce on September 27, 2000. Pacific salmon species covered in the FMP are coho salmon (*Oncorhynchus kisutch*), chinook salmon (*O. tshawytscha*), and pink salmon (*O. gorbuscha*). The FMP designates EFH for the Pacific salmon fishery as all those streams, lakes, ponds, wetlands, and other waterbodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above certain impassable barriers identified by Pacific Fish Management Council (PFMC), or above longstanding naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). Activities occurring above impassable barriers that are likely to adversely affect EFH are subject to the consultation provisions of the MSA.

The proposed action is within EFH for chinook salmon.

C. Summary of Proposed Actions

The proposed actions are described above (see *Description of the Proposed Action*, section I.B.).

D. Effects of the Proposed Action on EFH

1. General Considerations

This Opinion discusses in section II.A.3, *Analysis of Effects of Proposed Action,* the direct, indirect, and cumulative effects of the proposed action on anadromous fish habitat in the action area. The principal effects of the L3 diversion modifications on salmon EFH are a short-term increase in sediment and turbidity and disruption of migration timing.

2. Estuary and Nearshore EFH

Estuary and nearshore EFH is not affected by the proposed actions because they are several hundred miles inland, and relatively small in scope.

3. Coastal Pelagic EFH

Coastal pelagic EFH is not affected by the proposed action because the proposed action is several hundred miles inland, and relatively small in scope.

4. Salmon EFH

NOAA Fisheries finds that the proposed action may *adversely affect* EFH for Snake River chinook salmon.

E. Conclusion

Based on the analysis in Section III.A.3, *Analysis of Effects of Proposed Action*, NOAA Fisheries believes that the proposed actions may *adversely affect* EFH for Snake River spring/summer chinook salmon.

F. EFH Conservation Recommendations

Conservation recommendations are discretionary measures suggested to avoid, minimize, or otherwise offset adverse modification of EFH, or to develop additional information. NOAA Fisheries worked with the BPA, prior to consultation, to incorporate measures to avoid or minimize adverse effects of the proposed activities. Consequently, the proposed actions include mitigation to avoid effects on EFH, and additional non-discretionary conservation measures are required by this Opinion as Reasonable and Prudent measures and Terms and Conditions. No further conservation measures are necessary for EFH.

G. Statutory Requirements

The MSA and Federal implementing regulations (50 CFR Section 600.920) require Federal Action Agencies to provide NOAA Fisheries a written response to EFH Conservation Recommendations within 30 days of receipt. Since there are no conservation recommendations for the proposed actions in this consultation, the BPA is not required to provide a written response.

IV. REFERENCES

BOR. 2001. Evaluations of Six Priority Subbasins for the Implementation of 1-Year Plans in Fiscal Year 2002. October 31, 2001.

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NMFS. 2000. Biological Opinion: Reinitiation of Consultation on Operation of the Federal Columbia River Power System, Including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin. December 21, 2000.

NMFS. 4-4-2002. Interim Abundance and Productivity Targets for Interior Columbia Basin Salmon and Steelhead Listed Under the Endangered Species Act (ESA).

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APPENDIX A

TIMELINE OF EVENTS DURING EARLY CONSULTATION AND CONSULTATION

December 4, 2001	NOAA Fisheries and Bureau of Reclamation (BOR) met on-site at L3, L3A, and L6 to discuss design options.
December 10, 2001	BOR prepared a progress report, which was issued to all parties involved in the project.
January 7, 2002	NOAA Fisheries received draft specifications for the project.
January 8, 2002	BOR and NOAA Fisheries had a meeting to discuss plans and become familiar with the project.
January 15, 2002	NOAA Fisheries consulted Idaho Department of Fish and Game (IDFG) to establish a work window for the project.
January 18, 2002	An interagency and landowner meeting was conducted, during which NOAA Fisheries provided written comments on draft specifications.
March 1, 2002	NOAA Fisheries received a draft Biological Assessment (BA).
March 11, 2002	NOAA Fisheries provided BOR with initial comments on the draft BA.
March 20, 2002	NOAA Fisheries received revised specifications.
March 20, 2002	NOAA Fisheries Hydropower provided BOR with comments on specification revisions.
April 8, 2002	NOAA Fisheries received final BA.
April 10, 2002	NOAA Fisheries Habitat Conservation Division provided BOR with comments on specification revisions.
May 1, 2002	NOAA Fisheries Habitat Conservation Division completed review of BA and discovered new language which had not been included in the draft BA or previous discussions regarding use of stoplogs to block the fish passage notch. NOAA Fisheries questioned the BOR about the language; BOR stated that the irrigators had specifically requested that feature and were under the impression that NOAA Fisheries had agreed to that design during early consultation.
May 2, 2002	NOAA Fisheries had further discussions with BOR, asking them to modify the design to remove the stoplogs.
May 14, 2002	BOR notified NOAA Fisheries that the irrigator on L3A was willing to remove the stoplogs from the design, but that the irrigators on L3 were not. NOAA Fisheries decided to separate L3 and L3A to allow consultation to proceed on L3A while negotiations continued on L3.

June 26, 2002	NOAA Fisheries was notified that the irrigators at L3 had consented to remove the stoplogs from the design. NOAA Fisheries requested an amendment to the BA from BOR.
July 8, 2002	NOAA Fisheries received an amendment to the BA from Bonneville Power Administration (BPA), dated July 2, 2002.

APPENDIX B

JUVENILE FISH SCREEN CRITERIA FOR PUMP INTAKES

Developed by
National Marine Fisheries Service
Environmental & Technical Services Division
Portland, Oregon
May 9, 1996

The following criteria serve as an addendum to current National Marine Fisheries Service gravity intake juvenile fish screen criteria. These criteria apply to new pump intake screens and existing inadequate pump intake screens, as determined by fisheries agencies with project jurisdiction.

Definitions Used in Pump Intake Screen Criteria:

Pump intake screens are defined as screening devices attached directly to a pressurized diversion intake pipe.

Effective screen area is calculated by subtracting screen area occluded by structural members from the total screen area.

Screen mesh opening is the narrowest opening in screen mesh.

Approach velocity is the calculated velocity component perpendicular to the screen face.

Sweeping velocity is the flow velocity component parallel to the screen face with the pump turned off.

Active pump intake screens are equipped with a cleaning system with proven cleaning capability, and are cleaned as frequently as necessary to keep the screens clean. Passive pump intake screens have no cleaning system and should only be used when the debris load is expected to be low, and (1) if a small screen (less than 1 CFS pump) is over-sized to eliminate debris impingement, and (2) where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface, and (3) if the maximum diverted flow is less than .01% of the total minimum streamflow, or (4) the intake is deep in a reservoir, away from the shoreline.

Pump Intake Screen Flow Criteria:

The minimum effective screen area in square feet for an active pump intake screen is calculated by dividing the maximum flow rate in cubic feet per second (CFS) by an approach velocity of 0.4 feet per second (FPS). The minimum effective screen area in square feet for a passive pump intake screen is calculated by dividing the maximum flow rate in CFS by an approach velocity of 0.2 FPS. Certain site conditions may allow for a waiver of the 0.2 FPS approach velocity criteria and allow a passive screen to be installed using 0.4 FPS as design criteria. These cases will be considered on a site-by-site basis by the fisheries agencies.

If fry-sized salmonids (i.e. less than 60 millimeter fork length) are not ever present at the site and larger juvenile salmonids are present (as determined by agency biologists), approach velocity shall not exceed 0.8 FPS for active pump intake screens, or 0.4 FPS for passive pump intake screens. The allowable flow should be distributed to achieve uniform approach velocity (plus or minus 10%) over the entire screen area. Additional screen area or flow baffling may be required to account for designs with non-uniform approach velocity.

Pump Intake Screen Mesh Material:

Screen mesh openings shall not exceed 3/32 inch (2.38 mm) for woven wire or perforated plate screens, or 0.0689 inch (1.75 mm) for profile wire screens, with a minimum 27% open area. If fry-sized salmonids are never present at the site (by determination of agency biologists) screen mesh openings shall not exceed 1/4 inch (6.35 mm) for woven wire, perforated plate screens, or profile wire screens, with a minimum of 40% open area.

Screen mesh material and support structure shall work in tandem to be sufficiently durable to withstand the rigors of the installation site. No gaps greater than 3/32 inch shall exist in any type screen mesh or at points of mesh attachment. Special mesh materials that inhibit aquatic growth may be required at some sites.

Pump Intake Screen Location:

When possible, pump intake screens shall be placed in locations with sufficient sweeping velocity to sweep away debris removed from the screen face. Pump intake screens shall be submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features. A clear escape route should exist for fish that approach the intake volitionally or otherwise. For example, if a pump intake is located off of the river (such as in an intake lagoon), a conventional open channel screen should be considered, placed in the channel or at the edge of the river. Intakes in reservoirs should be as deep as practical, to reduce the numbers of juvenile salmonids that approach the intake. Adverse alterations to riverine habitat shall be minimized.

Pump Intake Screen Protection:

Pump intake screens shall be protected from heavy debris, icing and other conditions that may compromise screen integrity. Protection can be provided by using log booms, trash racks or mechanisms for removing the intake from the river during adverse conditions. An inspection and maintenance plan for the pump intake screen is required, to ensure that the screen is operating as designed per these criteria.

APPENDIX C

CHINOOK SALMON REDD COUNT TRENDS

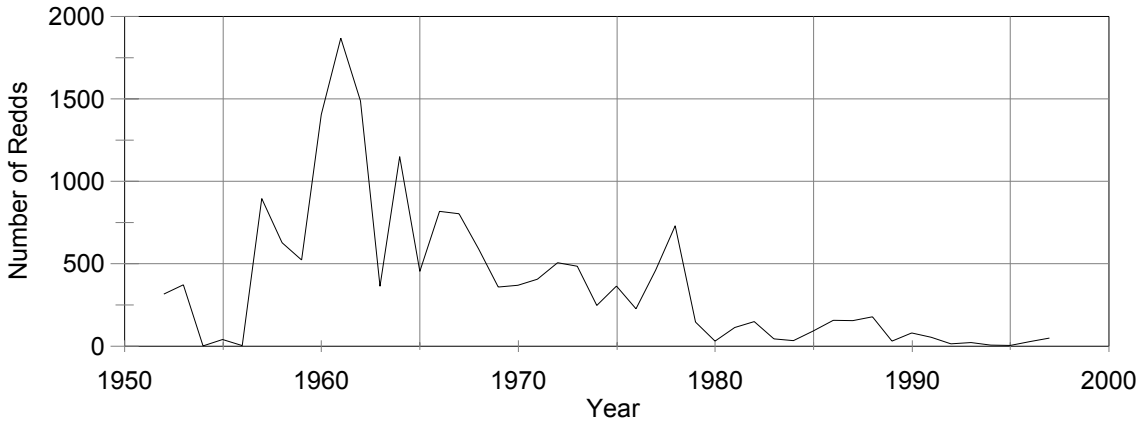

Figure 5. Redd count trend in the Lemhi River, 1952-1997. From www.streamnet.org.